ANSWER 16 OF 19 CAPLUS COPYRIGHT 2003 ACS
AN 2001:748194 CAPLUS
DN 135:285323
TI Protein **crystallization** in **microfluidic** structures
IN Weigl, Bernhard H.; Sygusch, Jurgen
PA USA
SO U.S. Pat. Appl. Publ., 16 pp.
CODEN: USXXCO
DT Patent
LA English
IC ICM C30B001-00
NCL 117206000
CC 9-1 (Biochemical Methods)
Section cross-reference(s): 75
FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2001027745	A1	20011011	US 2001-822595	20010330
	US 6409832	B2	20020625		
	US 2003075101	A1	20030424	US 2002-163148	20020603
PRAI	US 2000-193867P	P	20000331		
	US 2001-822595	A1	20010330		

AB Disclosed is a device for promoting protein **crystal** growth (PCG) using **microfluidic** channels. A protein sample and a solvent soln. are combined within a microfluidic channel having laminar flow characteristics which forms diffusion zones, providing for a well defined crystn. Protein crystals can then be harvested from the device. The device is particularly suited for microgravity conditions.
ST protein crystn microfluid channel
IT Crystallization apparatus
(device for protein crystn. in microfluidic structures)
IT Proteins, general, processes
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(device for protein crystn. in microfluidic structures)

L6 ANSWER 17 OF 19 CAPLUS COPYRIGHT 2003 ACS
AN 2001:748101 CAPLUS
DN 135:269680
TI Protein **crystallization** in **microfluidic** structures
IN Weigl, Bernhard H.; Sygusch, Jurgen
PA Micronics, Inc., USA
SO PCT Int. Appl., 50 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM G01N
CC 9-16 (Biochemical Methods)
Section cross-reference(s): 75
FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2001075415	A2	20011011	WO 2001-US10565	20010330
	WO 2001075415	A3	20020228		
	W: AU, CA, JP				
	RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR				
	AU 2001051218	A5	20011015	AU 2001-51218	20010330
	EP 1285106	A2	20030226	EP 2001-924572	20010330
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI, CY, TR				
PRAI	US 2000-193867P	P	20000331		
	WO 2001-US10565	W	20010330		

AB A device for promoting protein **crystal** growth (PCG) using **microfluidic** channels. A protein sample and a solvent soln. are combined within a microfluidic channel having laminar flow characteristics which forms diffusion zones, providing for a well defined crystn. Protein crystals can then be harvested from the device. The device is

ST spatiotemporal protein **crystal** growth **microfluidic** silicon devices

IT Crystal growth apparatus
Crystal nucleation
Crystallization
Electrostatic force
Semiconductor device fabrication
(spatiotemporal protein **crystal** growth studies using **microfluidic** silicon devices)

IT 7440-21-3, Silicon, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(p-type and n-type; spatiotemporal protein **crystal** growth studies using **microfluidic** silicon devices)

IT 9001-63-2, Lysozyme
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(spatiotemporal protein **crystal** growth studies using **microfluidic** silicon devices)

RE.CNT 29 THERE ARE 29 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Boistelle, R; J Crystal Growth 1988, V90, P14 CAPLUS
(2) Bousse, L; IEEE Trans Electron Devices ED-30 1983, P1263 CAPLUS
(3) Bousse, L; Surf Sci 1983, V135, P479 CAPLUS
(4) Cross, M; Rev Mod Phys 1993, V65, P851 CAPLUS
(5) Fung, C; IEEE Trans Electron Devices ED-33 1986, P8 CAPLUS
(6) Givargizov, E; Handbook of Crystal Growth 3 1994, P957
(7) Givargizov, E; J Crystal Growth 1991, V112, P758 CAPLUS
(8) Harame, D; IEEE Trans Electron Devices ED-34 1987, P1700 CAPLUS
(9) Hogg, R; Trans Faraday Soc 1966, V62, P1638 CAPLUS
(10) Israelachvili, J; Intermolecular and Surface Forces With Application to Colloidal and Biological Systems 1985, P174
(11) Kai, S; Spatiotemporal Patterns in Nonequilibrium Complex Systems 1995
(12) Manneville, P; Dissipative Structures and Weak Turbulene 1990
(13) McPherson, A; J Crystal Growth 1988, V90, P47 CAPLUS
(14) McPherson, A; Preparation and Analysis of Protein Crystals 1982
(15) Monch, W; Semiconductor Surfaces and Interfaces 1995, P20
(16) Muller, S; Modeling of Patterns in Space and Time Lecture Note in Biomathematics 1983
(17) Nicolis, G; Self Organisation in Non-Equilibrium Systems 1977
(18) Rosenberger, F; Fundamentals of Crystal Growth I 1979
(19) Rosenberger, F; J Crystal Growth 1983, V65, P91 CAPLUS
(20) Rosenberger, F; J Crystal Growth 1986, V76, P618 CAPLUS
(21) Rosenblum, W; J Crystal Growth 1991, V110, P171 CAPLUS
(22) Siu, W; IEEE Trans Electron Devices ED-26 1979, P1805 CAPLUS
(23) Sze, S; Physics of Semiconductor Devices 1981, P366
(24) Sze, S; VLSI Technology 1983, P71
(25) Tiller, W; J Crystal Growth 1986, V76, P607 CAPLUS
(26) Varker, C; ASTM STP 804 1983, P369 CAPLUS
(27) Venzl, G; J Chem Phys 1982, V77, P1302 CAPLUS
(28) Venzl, G; J Chem Phys 1982, V77, P1308 CAPLUS
(29) Young, C; J Crystal Growth 1988, V90, P79 CAPLUS

=>

particularly suited for microgravity conditions.
ST protein crystn microfluidic structure
IT **Crystallization** apparatus
(**Microfluidic** structures; protein crystn. in microfluidic structures)
IT Pumps
(air; protein crystn. in microfluidic structures)
IT Mixers (processing apparatus)
(jet, vortex; protein crystn. in microfluidic structures)
IT Flow
(laminar; protein crystn. in microfluidic structures)
IT Aggregates
Air
Buffers
Concentration (condition)
Containers
Crystal growth
Crystallization
Crystals
Diffusion
Filters
Fluids
Microgravity
Mixers (processing apparatus)
Samples
Sensors
Solutions
Solvents
(protein crystn. in **microfluidic** structures)
IT Plastics, uses
RL: DEV (Device component use); USES (Uses)
(protein crystn. in microfluidic structures)
IT Proteins, general, processes
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(protein crystn. in microfluidic structures)

L6 ANSWER 19 OF 19 CAPLUS COPYRIGHT 2003 ACS
AN 1999:30602 CAPLUS
DN 130:278737
TI Spatiotemporal protein **crystal** growth studies using **microfluidic** silicon devices
AU Sanjoh, Akira; Tsukihara, Tomitake
CS Advanced Technology Research Laboratories, Sumitomo Metals, Amagasaki, 660, Japan
SO Journal of Crystal Growth (1999), 196(2-4), 691-702
CODEN: JCRGAE; ISSN: 0022-0248
PB Elsevier Science B.V.
DT Journal
LA English
CC 9-1 (Biochemical Methods)
AB Fundamental investigations of protein crystn. using miniaturized microfluidic silicon devices were presented towards achieving spatiotemporal nucleation and subsequent post-nucleation growth. The developed microfluidic silicon device was typically composed of crystal growth cell, reservoir cell, and optionally of heater elements for supersatn. control. A specific fine pattern area in the growth cell which was fabricated on the silicon substrate with doped p- and n-type silicon layers, served as spatially selective nucleation site of dissolved protein mols. through electrostatic attractive force. In a model material, hen egg white lysozyme, a large no. of crystals were grown on the defined nucleation site evenly spaced from each other, whereas parasitic crystal growth positioned around the selective nucleation site, was suppressed by the effects of electrostatic repulsive force between the doped silicon surface and charged protein mols. A possible crystn. mechanism of describing the heterogeneous nucleation during the initial stage and during the growth of the crystal at the electrolyte-semiconductor silicon surface is proposed and discussed.

L2 ANSWER 5 OF 5 CAPLUS COPYRIGHT 2003 ACS
AN 2000:305127 CAPLUS
DN 133:147031
TI A micromachined double **lumen** microdialysis probe connector with incorporated sensor for on-line sampling
AU Bohm, S.; Olthuis, W.; Bergveld, P.
CS MESA+ Research Institute, University of Twente, Enschede, 7500 AE, Neth.
SO Sensors and Actuators, B: Chemical (2000), B63(3), 201-208
CODEN: SABCEB; ISSN: 0925-4005
PB Elsevier Science S.A.
DT Journal
LA English
CC 9-1 (Biochemical Methods)
Section cross-reference(s): 6, 79
AB In this paper, a micromachined double **lumen** microdialysis probe connector for online, in-vivo sampling is presented. The connector forms an integral part of a double **lumen** type microdialysis probe and guides the flow of sample fluid ('dialyzate') directly into a flow cell with space for integrated sensors. Basically, the connector is a sandwich construction of two, multistep KOH etched silicon wafers which, after bonding allows the easy insertion of two concentric fused silica capillaries, required to construct the probe. For the exptl. evaluation of the performance, in this work, a chloride selective sensor was integrated in the flow cell of the connector to continuously measure the chloride concn. in the dialyzate flow. It will be shown that by adopting micromachining techniques, the induced lag time of the measurement can easily be decreased by a factor of more than 5, as compared to a conventional probe connected to a flow-through sensor. Another benefit of the proposed direct coupling of double **lumen** microdialysis probes and **microfluidic** structures in silicon, is the fact that all crit. fluidic connections, esp. the probe/sensor connection, are kept inside, making the microanal. system more rigid.
ST microdialysis double **lumen** probe sampling sensor chloride; dialysis double **lumen** probe sampling sensor micromachining chloride
IT Dialysis
(microdialysis; micromachined double **lumen** microdialysis probe connector with incorporated sensor for online sampling)
IT Micromachining
Sampling
Sensors
(micromachined double **lumen** microdialysis probe connector with incorporated sensor for online sampling)
IT Sampling apparatus
(probes; micromachined double **lumen** microdialysis probe connector with incorporated sensor for online sampling)
IT 16887-00-6, Chloride, analysis
RL: ANT (Analyte); ANST (Analytical study)
(micromachined double **lumen** microdialysis probe connector with incorporated sensor for online sampling)
RE.CNT 29 THERE ARE 29 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Anon; Handbook of Chemistry and Physics, 74th edn 1993
(2) Bergveld, P; Clinical Chemistry, an Overview 1989, P113
(3) Bergveld, P; International Patent Application, PCT/NL99/00057 1999
(4) Bohm, S; Proc SPIE Int Symposium on Environmental and Industrial Sensing 1999, P24 CAPLUS
(5) Bohm, S; Proc of the 2nd International Conference on Microreaction Technology 1998, P278
(6) Bohm, S; Proc of the .mu.TAS '98 Workshop 1998, P31
(7) Christiansen, T; Acta Anaesthesiol Scand 1995, V39(Suppl 104), P31
(8) den Besten, C; Micro Electro Mechanical Systems '92 1992, P104
(9) Erickson, K; Clin Chem 1993, V39(2), P287
(10) Fraser, D; Biosensors in the Body 1997, P10
(11) Hintsche, R; Sens Actuators, B 1995, V26-27, P471
(12) Kehr, J; J Neurosci Methods 1993, V48, P251 CAPLUS

(13) Kohama, A; Crit Care Med 1985, V12, P940
(14) Marconi, W; Analysis 1993, V21(2), PM20 CAPLUS
(15) Mascini, M; Advances in Biosensors 1993, Suppl 1, P109
(16) Mishra, P; US 5191900 1993
(17) Mishra, P; US 5441481 1995
(18) Morrison, P; Techniques in the Behavioral and Neural Sciences in Microdialysis in the Neurosciences 1991, V7, P47 CAPLUS
(19) Oeseburg, B; Scand J Clin Lab Invest 1987, V47(Suppl 188), P31
(20) Pickup, J; Biosens Bioelectron 1991, V6, P639 MEDLINE
(21) Ruzicka, J; Chemical Analysis 1981, V62
(22) Schnakenberg, U; Sens Actuators, B 1996, V34, P476
(23) Torto, N; Anal Chim Acta 1999, V179, P281
(24) Uhlig, A; Sens Actuators, B 1996, V34, P252
(25) Ungerstedt, U; US 4694832 1987
(26) Ungerstedt, U; Bull Schweiz Akad Med Wiss 1974, V1278, P1
(27) Ungerstedt, U; J Intern Med 1991, V230(4), P365 MEDLINE
(28) Ungerstedt, U; Life Sci 1987, V41, P861 CAPLUS
(29) Ungerstedt, U; Measurement of neurotransmitter release by intracranial dialysis, measurement of neurotransmitter release in vivo 1984

=>